

NEW SPECIES OF LETHAEINI FROM MADAGASCAR (HETEROPTERA: LYGAEOIDEA: RHYPAROCHROMIDAE)

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Abstract.—Three new species of *Neolethaeus* and one of *Lethaeus* are described from Madagascar. One of these (*Neolethaeus madagascariensis*, new species) is related to a West African species. These species represent some of the most striking species of a large complex that radiates on the island. Dorsal views are given for *Neolethaeus polhemi*, new species and *Lethaeus gigas*, new species. Illustrations of the clasper, sperm reservoir and genital capsule are included for three of the four species. Generic and geographic relationships are discussed.

The Lethaeini constitutes a distinctive and well defined monophyletic tribe within the Rhyparochromidae. It is primarily a tropical and subtropical taxon with only a few genera and species in temperate regions. Many of the species are abundant in the tropics.

Despite early descriptions by Reuter (1887) and Bergroth (1905) the fauna of Madagascar has been little studied. In the present paper we describe four striking species from the great island in honor of Dr. John Polhemus in recognition of his many important contributions to Hemipterology, and especially in admiration for his indefatigable and invaluable field work on all continents including Madagascar.

Despite the important synapomorphies that define the tribe (O'Donnell, 1991; Slater and Woodward, 1980) generic limits in the eastern hemisphere are, in part, unsatisfactory. This is especially true of a complex of medium to large sized species that traditionally included *Lethaeus* and its allies. O'Donnell (1991) points out in her study of the claspers and aedeagus that while the species of *Lethaeus* itself that she examined (4 species) were very similar and appeared to form a monophyletic group, species currently placed in *Neolethaeus* show three very dissimilar sperm reservoirs and she believes the genus to be polyphyletic.

It is beyond the scope of this paper to attempt to untangle the cladistic relationships of species now listed in *Neolethaeus*. However the Madagascar species described below are assigned to that genus by virtue of the following characteristics: 1. Pronotum with a v-shaped, punctate anterior pronotal collar which is delimited posteriorly by a series of punctures rather than as an impressed line. 2. Male hind femora enlarged and bearing a series of setiferous tubercles in addition to socketed spines. 3. A large metapleural evaporative area that covers the inner one-third to one half of the mesopleuron and has the outer (dorsal) margin straight or nearly so (truncate). 4. An anteriorly placed spine on the explanate pronotal margins. 5. Paired iridescent areas on the head that are non-striate. 6. Long holding sclerites that unite distally in a "v."

It should be noted that the Madagascar lethaeine fauna will undoubtedly prove to be quite extensive. In addition to the previously described species (*L. longirostris*

Reuter, *L. nodulinervis* Bergroth) we have before us one or more examples of at least ten additional species, most belonging to the *Lethaeus-Neolethaeus* complex as well as species related to *Noteolethaeus* and *Camptocera*. It seems probable that as with many other groups of plants and animals, the Lethaeini will have radiated widely on the island.

While nothing really significant is known of the biology of any of the Madagascar species, there is a strong suggestion from the specimen label data that these insects are associated with forest rather than savannah. O'Donnell (1986) notes that many Lethaeini appear to be associated with more mesic habitats than many other rhyparochromines. The striking elongate labium of many species suggests feeding on seeds imbedded in fruits such as *Ficus* (note the similar condition found in fig-feeding species of Heterogastrinae; Slater 1971.)

Twenty-three genera of Lethaeini are currently recognized from the Eastern Hemisphere (we believe *Orbellis* Distant will prove to be a junior synonym of *Neolethaeus*). O'Donnell (1991) places these genera into four "groups," three of which occur in the Eastern Hemisphere. *Neolethaeus* is placed in "Group III," characterized by apomorphic long v-shaped holding sclerites of the aedeagus. Within this group she believes that *Aristaenetus* Distant, *Lophoraglius* Wagner and *Neolethaeus* probably share a common ancestor because of the highly modified shape of the claspers. Woodward and O'Donnell (1988) discuss the position of *Aristaenetus* in detail and it is not considered further here except to suggest relationship to *Lethaeo-grandellus* Scudder.

The most difficult problem is to ascertain the generic limits of *Neolethaeus* and *Lophoraglius* (*Porrectolethaeus* Scudder, which we have not examined, may also be involved, but it is readily recognizable by the mutic fore femora and the very long head, with the tylus extending anteriorly beyond the end of the first antennal segment; it is known only from Senegal). Species of *Lophoraglius* have a pronotal collar that is usually not strongly produced into a "V" and is limited posteriorly by a distinct linear depression that usually has only a few punctures on the collar. Males tend not to have enlarged hind femora, nor a series of tuberculate spines, but both genera have explanate lateral pronotal margins with an anterior trichobothrium present and similar iridescent areas at the base of the head. Although some species are intermediate in some of these features, we feel that the species described below fit the current, albeit somewhat unsatisfactory, concept of *Neolethaeus*. We recognize that the recognition and definition of monophyletic units within this complex is one of the most desirable desiderata in the systematics of the Lethaeini.

Color nomenclature used in the descriptions follows Smithe (1975, 1981). All measurements are in millimeters. IRSM is the acronym for the Institut Scientifique Madagascar, Paris Museum.

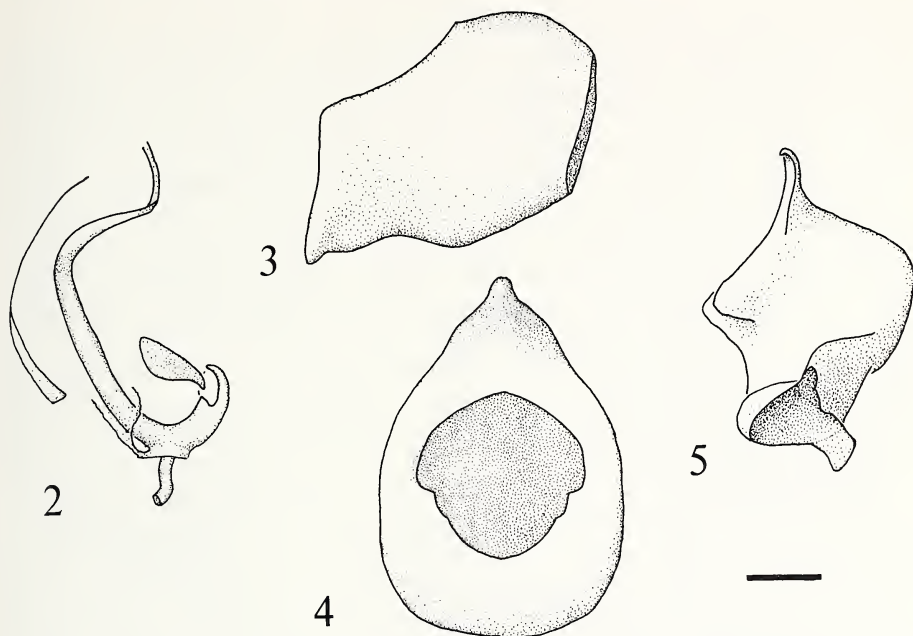
***Neolethaeus polhemi*, new species**

Figs. 1–5

Description. A brightly colored, variegated species, amber on cream color ground. Head, most of pronotal surface, entire scutellum, an irregular but complete transverse corial fascia which attains lateral corial margins, basal and subdistal streaks on clavus and apex of corium amber. Anterior pronotal collar, a broad irregular posterior prono-



Fig. 1. *Neolethaeus polhemi*, n.sp., dorsal view.



Figs. 2–5. Sperm reservoir, lateral view, scale line = 0.1mm. Fig. 3. Genital capsule, lateral view, scale line = 0.25mm. Fig. 4. Genital capsule, dorsal view, scale line = 0.25mm. Fig. 5. Clasper, scale line = 0.1mm.

tal margin and narrow explanate lateral margins cream color. Collar dark mesally. Posterior pronotal lobe with a scalloped maroon macula on either side of midline immediately before cream color posterior stripe. Ground color of clavus and corium cream color mixed with darker amber to chestnut markings. Membrane translucent buff. Scutellum amber except for cream apex and subdistal maroon macula. Antennae conspicuously variegated—first segment, proximal $\frac{1}{5}$ of second segment and proximal $\frac{1}{5}$ of third segment amber, distal $\frac{1}{5}$ of third segment cream color, remainder of antennae dusky brown. Femora amber with metafemora darker, approaching maroon; tibiae buff; distal ends of tibiae, first tarsal segment and all of second and third tarsal segments chestnut. Pleuron and sternum nearly uniformly amber. Small inconspicuous light hairs arising from each puncture of dorsal surface, latter absent from calli. Punctures shallow and widely separated over rest of dorsal and pleural surfaces. Claval punctures forming distinct rows, one adjacent to scutellum and another to corium, area between rows with numerous irregularly-spaced punctures.

Head subacuminata, non-declivata, tylus attaining middle of first antennal segment. Ocelli very large, larger than distance between ocellus and compound eye. Head with two large iridescent areas extending nearly to ocelli, not finely striate. Head length 0.82, width 1.20, interocular space 0.60. Pronotum with a well-defined, v-shaped anterior collar bounded posteriorly by a deep line of punctures except at midline. Lateral pronotal margins explanate and upturned. Trichobothrium present on pronotal edge at level of collar. Anterior and posterior lobes differentiated by a

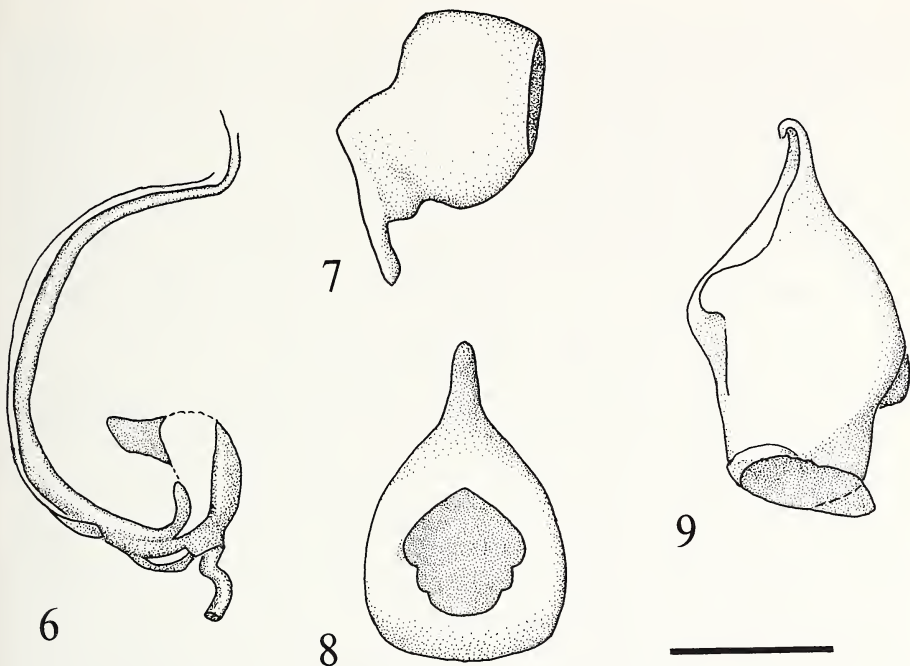
cluster of punctures, more prominent laterally. Posterior pronotal margin evenly convex. Pronotal length 1.40, width 2.42. Scutellum lacking a median carina, with anterior third depressed mesally. Scutellar length 1.40, width 1.31. Claval commissure length 1.04. Lateral corial margins only slightly widened along length. Midline distance from apex of clavus to apex of corium 1.80. Midline distance from apex of corium to apex of membrane 1.60. Metathoracic scent gland auricle short, slightly curving posteriorly; almost as broad as long; evaporative area with dorso-lateral margin evenly truncate (straight), occupying inner third of metapleuron. Mesopleuron and metapleuron lateral to scent gland slightly swollen, metapleuron with fine striae near lateral margin. Fore and hind femora about equally and only moderately incrassate, former with three sharp ventral spines near distal end, latter with an irregular series of large, thick blunt tuberculate spines along most of length, also bearing a row of widely spaced spines. Labium attaining metacoxae. Length of labial segments (from paratype) I 1.04, II 1.04, III 0.90, IV 0.62. Antennae slender, terete, Length of antennal segments I 1.0, II 1.44, III 1.32, IV 1.44. Total body length 7.72.

Male genital capsule (Figs. 3, 4) with prominent, ventrally bulging projection that ends in a rounded thumb-like protrusion. Clasper (Fig. 5) with blade broad, narrowing abruptly to a pointed recurved tip; shank short; blade and shank concave; bluntly rounded inner projection moderately produced, closer to area of attachment than broadly rounded outer projection; flange present. Sperm reservoir (Fig. 2) with sleeve apparent only basally, arising from spur of base; vesical seminal duct long, narrow, becoming flattened distally beyond strong bend (several distal coils not shown on figure); wings long, relatively broad; holding sclerites long, ribbon-like, meeting distally in a sharp, fully sclerotized "v."

Spermatheca with globose bulb, distal flange not apparent, putative proximal flange asymmetrical, pointed on one side, spermathecal duct broadened and slightly more sclerotized proximal to this.

Types. Holotype, ♂, MADAGASCAR, Est dct. Sambava R. N. XI, Marojejy ouest, 1850 m., ii-60, P. Soga In (IRSM). Paratypes: MADAGASCAR, 3 females, same data as holotype; 2 males, same as holotype except 1600 m., xi-59; 1 female, Est dct. Sambava R. N. XII Marojejy Beondroka, 1200 m, vi-60, P. Soga; 1 male, Est Ankasoka, 1130 m., dct. Morainanga, 21.x.57, P. Griveaud; 1 female, Est Ankalampona, 130 m., Navana-Marointsetra, iii-58, Soga Ramarizonina; 1 male, Est dct. Tamatave Ambodihatafana (Rte. Fenerive est), x-58, Randimby; 1 male, 1 female, Centre dct. Ambohimahasoia foret Tsarafidy, 1450 m., xii-59 & I-60, P. Griveaud; 1 male, Andranotobaka, alt. 1400 m., Amatolampy, iii-57, P. Griv.; 1 female, same data except iv-57 (all above in IRSM and J. A. Slater collections).

Variation. There is considerable sexual dimorphism, especially in the development of the hind femora which in the females are scarcely enlarged and at most have 3-4 small well-separated spines present. The fore femoral spines are very small in females. Some males have the hind femora more strongly incrassate than the fore femora. The dark area posteriorly on the pronotum mesally just before the basal yellow stripe is sometimes reduced to an irregular dark stripe rather than an ovoid area. The apex of the scutellum sometimes is dark and this dark area may extend some distance up the apical area of the scutellum as a mesal stripe.



Figs. 6–9. *Neolethaeus madagascariensis*, n.sp. Fig. 6. Sperm reservoir, lateral view, scale line = 0.25mm. Fig. 7. Genital capsule, lateral view, scale line = 1mm. Fig. 8. Genital capsule, dorsal view, scale line = 1mm. Fig. 9. Clasper, scale line = 0.25mm.

Neolethaeus madagascariensis, new species

Figs. 6–9

Description. A large, robust, broadly elliptical species. Head with a large ovoid macula on either side of midline posteriorly on pronotum immediately before buff yellow posterior margin, femora, first, fourth, distal $\frac{1}{2}$ and proximal $\frac{2}{3}$ of second and third antennal segments dusty brown. Pronotum bright chestnut over most of surface with anterior collar, explanate lateral margins and narrow posterior margin buff-yellow (latter not extending over lateral $\frac{1}{3}$ of posterior margin). Scutellum and hemelytra nearly uniformly russet. Apex of tibiae and all of tarsi dusky brown to black. An obscure series of three lighter streaks along Cu adjacent to claval suture and one at junction of Sc and R+M. Proximal $\frac{2}{3}$ of antennal segment two buff, distal $\frac{1}{3}$ of antennal segment three cream color. Essentially glabrous dorsally, tiny scattered decumbent hairs present. Punctures well separated from one another, conspicuous on posterior half of pronotum, scutellum and entire hemelytra, those on anterior pronotal collar, pronotum and scutellum dark, otherwise concolorous with ground color of body. Calli impunctate, head inconspicuously rugose.

Head acuminate, non-declivent, tylus reaching about middle of first antennal segment. Head length 1.38, width 1.70, interocular space 1.00. Pronotal v-shaped anterior collar well developed, punctate. Lateral pronotal margins broadly explanate,

with trichobothrium present at anterior corner; posterior pronotal margin slightly convex. Pronotal length 2.10, width 3.66. Scutellum with a slightly swollen Y-shaped elevation on an impunctate line in middle, lacking a distinct elevated carina. Scutellar length 2.86, width 2.02. Hemelytral R+M vein strongly elevated and carinate, lateral corial margins nearly straight. Claval commissure length 1.20. Midline distance from apex of clavus to apex of corium 2.38. Midline distance from apex of corium to apex of body 1.60. Evaporative area well developed, truncate distally. Lateral (dorsal) margins of pleura with finely striate areas, that of metapleuron slightly raised, conspicuous. All femora incrassate. Fore femur with four sharp spines distally on ventral surface and three to four elongate tuberculate spinules. Middle femur with short spines in one row and coarse tubercles in another row. Hind femur with very large coarse tubercles over entire ventral surface. Antennae slender, terete. Length of antennal segments I 1.38, II 2.20, III 1.84, IV 1.84. Labium very elongate extending posteriorly almost to abdominal sternum five. Length of labium (from female paratype) I 2.31, II 2.46, III 2.80, IV 1.16. Total body length 9.04.

Male genital capsule (Figs. 7, 8) with long, finger-like extension projecting ventrally from posterior rim. Clasper (Fig. 9) with blade broad, tip pointed, recurved; blade and shank concave; shank reduced; inner projection bluntly rounded; outer projection broadly rounded, closer to area of attachment than inner projection. Sperm reservoir (Fig. 6) with sleeve apparently fused with vesical seminal duct; vesical seminal duct long, narrow, with a thickened kink and several distal coils (not shown on figure) and two curving extensions proximally, opposite arcuate extension; wings duck-bill shaped; holding sclerites long, narrow, ribbon-like, meeting distally to form a "v", less sclerotized where they join.

Spermatheca with very long duct, narrow for most of its length but broadening abruptly about one bulb diameter from bulb, where proximal flange apparently becomes part of duct; proximal flange an asymmetrical, horseshoe-shaped sclerite; distal flange not apparent.

Types. Holotype, ♂, MADAGASCAR, Andobo, 190 m., Forêt Antsingy, dct. Antsalova, ii-57, P. Griv (IRSM). Paratypes: 1 male, 2 females, same data as holotype (IRSM and J. A. Slater collections).

Discussion. This striking species, while belonging to a complex well represented on Madagascar, is actually most closely related to the West African species *Neolethaeus giganteus* Scudder. This appears to be another example of the affinities of the old forest fauna, of which many elements now appear to be isolated in West Africa and Madagascar, with Oriental and South African isolates also represented.

Neolethaeus madagascariensis differs from *N. giganteus* in a number of features. The West African species has a distinct pale line through the middle of the pronotum, a pale yellow rather than black first antennal segment, a less elongate tapering head, and relatively shorter antennae—in *N. giganteus* the head width is greater than the length of the third antennal segment, whereas the reverse is true in *N. madagascariensis*. The genital capsules are also strikingly different. *N. giganteus* has a relatively broader more arcuate pronotum. This can be expressed as the former having the ratio of the width of the pronotum across the humeral angles compared to the width measured at the level of the posterior margin of the anterior collar only 1.33, whereas in *N. madagascariensis* the ratio is well over 1.4.

Scudder (1963) described his species from Ibadan, Nigeria (type series) and from

Sierra Leone. His description is of a female as apparently the male was not in good condition. However, his measurement of the pronotal width must be in error as he reports it as 1.41 and the length as 1.94. In the specimens we have examined the pronotal width is always considerably greater than the length.

We have examined the following material of *N. giganteus*: NIGERIA: 1 male, Univ. of Ibadan, 28.v.49, A. U. Oboite (at light); 1 male, U-I-Campus, 1.ii.71, "under leaves 589," A. U. Oboite; 1 male, 1 female, Ile-Ife W. State, 9.iii.75, J. T. Medler; 1 male, Udo F. R. MW State, 11.iv.75, J. T. Medler. GHANA: 1 female, Tafo, 27.vii.66, Leston ("ant ecology sample 132 46b"); 1 female, Tafo, 3.viii.66, D. Leston ("ant ecology sample 152b") (all above in J. A. Slater collection).

Neolethaeus maculosus, new species

Description. Head, calli area of pronotum, scutellum and a broad, complete transverse hemelytral fascia ferruginous. Distal end of scutellum burnt umber grading to dark grayish brown. Pronotum posterior to calli shading from buff yellow across posterior margin anteriorly to cinnamon. Anterior pronotal collar and explanate lateral margins shading from buff yellow to chestnut. Clavus and corium anterior to dark transverse fascia tawny. Lateral corial margin with a small, elongate triangular buff yellow macula at level of anterior half of claval commissure. A very large cream color apical corial macula, extending mesally to vein Cu. Membrane translucent cinnamon. Legs buff. Antennae with distal end of segment two, proximal $\frac{2}{3}$ of segment three and all of segment four dusky brown. Rest of antennae orange-rufous with distal area of segment three almost cream color. Essentially glabrous above, a few scattered inconspicuous tiny hairs present. Head inconspicuously rugose; calli with a few obscure tiny punctures, remainder of dorsal surface, including anterior pronotal collar, with prominent punctures but these well separated from one another. Clavus with one regular row of punctures along claval and corial suture, otherwise covered with a field of irregular punctures.

Head non-declivent, tylus almost attaining middle of first antennal segment. Ocelli very large, larger than distance from ocellus to compound eye. Iridescent areas at base of head double, not finely striate. Head length 1.20, width 1.30, interocular space 0.68. Anterior pronotal collar strongly differentiated, V-shaped, with a line of punctures delineating posterior margin. Lateral margins of pronotum strongly explanate, nearly evenly tapering anteriorly from humeral angles. A conspicuous seta at level of posterior margin of pronotal collar. Posterior pronotal margin shallowly convex. Pronotal length 1.56, width 2.75. Scutellum slightly swollen, lacking a median carina, depressed mesally near base. Scutellar length 1.52, width 1.48. Claval commissure length 0.94. Midline distance from apex of clavus to apex of corium 1.80. Midline distance from apex of corium to apex of body 1.44. Dorsal (lateral) margin of metapleuron with a series of fine striae. Mesopleuron with much less conspicuous striae. Metathoracic scent gland auricle about as wide as long, subelliptical, not curving posteriorly, distal end blunt. Evaporative area very large, distally truncate. Fore femur moderately incrassate with 4 short sharp black spines distally on ventral surface with a socketed spine immediately proximad. Middle femur and hind femur with two rows of short sharp spines, four posteriorly, five anteriorly. Tibiae with large sharp spines through entire shaft. Antennae slender, terete. Length

of antennal segments I 1.24, II 1.46, III 1.28, IV 1.44. Labium extending posteriorly between metacoxae. Length of labial segments I 1.20, II 1.12, III 1.08, IV 0.70. Total body length 8.54.

Types. Holotype, ♀, MADAGASCAR, Reserve Nat. III. Anbatovositra, Anoranomalaza, i-57, P. Soga (IRSM).

Comments. Although structurally rather similar to *N. polhemi*, the striking coloration, especially the contrast of the enormous apical corial macula with the remainder of the hemelytra, indicates that this is certainly a distinct species.

Lethaeus gigas, new species

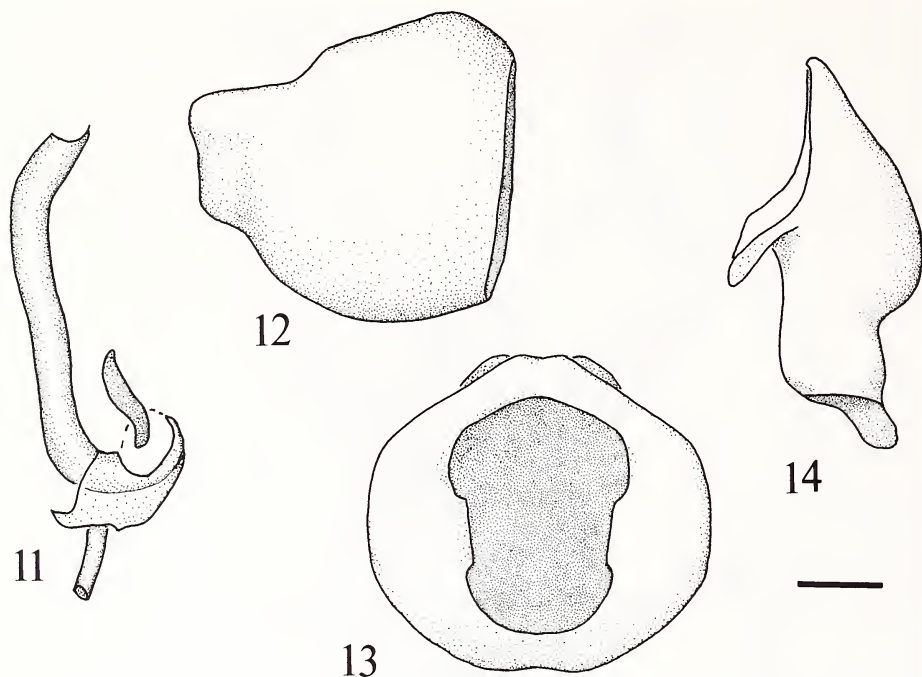
Figs. 10-14

Description. A very large robust species. Head maroon with warm sepia to cinnamon rufous tylus. Anterior pronotal lobe shining, chestnut; posterior lobe cinnamon rufous with a buff yellow ovoid macula along posterior margin mesad of raised humeral angle; explanate pronotal margins cream color. Scutellum cinnamon rufous laterally becoming maroon basally. Hemelytra buff yellow with five obscure maroon maculae on corium. An irregular, obscure cream color macula on corium at level of distal fifth of scutellum. Membrane buff with veins buff yellow. Antennae and legs buff to buff yellow, distal end of antennal segment two and apical half of segment four maroon. Pleural and ventral surfaces nearly uniformly maroon. Abdomen chestnut.

Head non-declivent, tylus reaching proximal third of first antennal segment. Iridescent areas at base of head large, ovoid, almost attaining ocelli laterally, finely striate. Head length 1.80, width 2.00, interocular space 1.06. Pronotum with distinct anterior and posterior lobes. Anterior pronotal lobe convexly swollen, much higher than posterior lobe, polished, shining, with an anterior collar-like area composed of coarse punctures and V-shaped, but delimited posteriorly only by a series of closely set punctures. Posterior pronotal lobe subshining, relatively flat and coarsely punctate. Lateral pronotal margins explanate, constricted between anterior and posterior lobes; posterior pronotal margin straight. Pronotal length 3.24, width 4.14. Scutellum with a smooth elevation immediately mesad of lateral line of punctures, central area depressed. Scutellar length 2.70, width 2.36. Clavus with three distinct rows of punctures with numerous irregularly placed punctures between inner row lying adjacent to scutellum and regular row along vein P. Claval commissure length 1.18. Midline distance from apex of clavus to apex of corium 2.70. Midline distance from apex of corium to apex of body 2.06. Mesosternum with somewhat flattened area mesally with a series of fine ridges on either side of groove for labium. Metathoracic scent gland auricle linear, longer than wide, not curving posteriorly, sub-elliptical with blunt apex. Evaporative area occupying only ventral third of metapleuron with outer margin almost straight (truncate). Pleura strongly shining. Metapleuron with series of fine striate ridges laterally. Fore femur strongly incrassate, armed below at distal end with three short sharp, black tipped spines and an additional much larger ventral spine somewhat proximad, ventral surface shallowly grooved distally, remainder of surface with numerous small dark tubercles (these also numerous on mutic middle femur). Hind femur not incrassate, bearing ventrally near distal end a single very small inconspicuous spine-like hair. Middle and hind tibiae with a number of stout



Fig. 10. *Lethaeus gigas*, n.sp., dorsal view.



Figs. 11-14. Fig. 11. Sperm reservoir, lateral view, scale line = 0.1mm. Fig. 12. Genital capsule, lateral view, scale line = 0.25mm. Fig. 13. Genital capsule, dorsal view, scale line = 0.25mm. Fig. 14. Clasper, scale line = 0.1mm.

dark spines. Head with small punctures dorsally, punctate ventrally; remainder of dorsal surface other than anterior pronotal lobe with large coarse punctures, those on hemelytra dark and strongly contrasting with ground color of body surface. Antennae slender, filiform, fourth segment not fusiform. Length of antennal segments I 1.80, II 3.10, III 2.34, IV 2.08. Labium very elongate, extending caudally onto fifth abdominal sternite. Second segment with distal portion "bowed" and widened. Length of labial segments (from paratype) I 2.56, II 1.38, III 1.54, IV 0.58. Total body length 13.87.

Types. Holotype, ♂, MADAGASCAR, Ile Sainte-Marie Forêt de Kalaloo, x-60, P. Griveaud (IRSM). Paratypes: MADAGASCAR: 2 females, same data as holotype; 1 male, same data as holotype except iii-60, Andria R.; 1 male, Ile Sainte-Marie Imbohidena, iv-59, R. E.; 3 females, Est Ambodivoangy, 20 m, dct Maroantsetra, iii-53, Soga-Raharizonina; 1 female, Est Ivontaka, 8 m., dct Maroantsetra, iii-58, Soga-Raharizonina; 1 male, 3 females, Est Ankalampona, 130 m, Navana-Maroantsetra, iii-58, Soga-Raharizonina; 1 male, Sambirano Nosy-Be forêt de Lokobe, xii-58, Andria Robinson; 1 male, Est dct. Tamatouve (Rtevers Férèrive. Est) Garotousy, xii-58, R. E; 1 female, Reserfe nat. III Andranomalaza, Ampanalamoosy, R. Saga (IRSM and J. A. Slater collections).

Variation. The maroon maculae on the corium varies greatly, in some specimens the corium is largely maroon with buff interspaces, in others the maroon maculae

tend to coalesce posteriorly and in others they are barely visible. Specimens vary considerably in the amount and degree of dorsal subshining and polished areas. Some of this may be due to grease on the specimens, but sometimes it appears to be variation. This is especially true of the anterior pronotal lobe which varies from completely shining as in the holotype to as dull as the posterior lobe in some of the paratypes. Females have the anterior pronotal lobe less strongly swollen than do most males, and have much smaller major fore femoral spines. One male paratype has a double large spine on the left femur.

ACKNOWLEDGMENTS

We are indebted to M. Pierre Malzy, formerly of ORSTOM (ex IRSM), of Tananarive for making this material available for study and to Mr. Steven Thurston (American Museum of Natural History) for execution of the dorsal view illustrations.

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